

<b>REQUEST FOR QUOTATION</b> (THIS IS NOT AN ORDER)			THIS RFQ <input checked="" type="checkbox"/> IS <input type="checkbox"/> IS NOT A SMALL BUSINESS SET-ASIDE		PAGE 1 OF 23	
1. REQUEST NO. N00167-04-Q-0432		2. DATE ISSUED 04 JUL 21		3. REQUISITION/PURCHASE REQUEST NO. 61200 41764581		4. CERT. FOR NAT. DEF. UNDER BDSA REG. 2 AND/OR DMS REG. 1
5a. ISSUED BY CONTRACTING OFFICER NSWC CARDEROCK DIVISION				6. DELIVER BY (Date) 04 SEP 15		
5b. FOR INFORMATION CALL (NO COLLECT CALLS)				7. DELIVERY <input checked="" type="checkbox"/> FOB DESTINATION <input type="checkbox"/> OTHER (See Schedule)		
NAME 9500 MACARTHUR BLVD. W BETHESDA, MD 20817-5700 RAY PARK		TELEPHONE NUMBER AREA CODE NUMBER 301 227-1121 FAX: 301 227-1847		9. DESTINATION a. NAME OF CONSIGNEE RECEIVING CODE 3341 BLDG 143 RECEIVING OFFICER NAVAL SURFACE WARFARE CENTER		
a. NAME		b. COMPANY		b. STREET ADDRESS 9500 MACARTHUR BLVD		
c. STREET ADDRESS				c. CITY W BETHESDA		
d. CITY		e. STATE		f. ZIP CODE		d. STATE MD
						e. ZIP CODE 20817-5700
10. PLEASE FURNISH QUOTATIONS TO THE ISSUING OFFICE IN BLOCK 5A ON OR BEFORE CLOSE OF BUSINESS (Date) 04 AUG 09			IMPORTANT: This is a request for information and quotations furnished are not offers. If you are unable to quote, please so indicate on this form and return it to the address in Block 5A. This request does not commit the Government to pay any costs incurred in the preparation of the submission of this quotation or to contract for supplies or services. Supplies are of domestic origin unless otherwise indicated by quoter. Any representations and/or certifications attached to this Request for Quotations must be completed by the quoter.			
<b>11. SCHEDULE (Include applicable Federal, State and local taxes)</b>						
ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	
0001	REQN. NO. 61200 /41764581 ITEM NAME: PROVIDE SERVICES TO MACHINE TEST SPECIMENS IN ACCORDANCE WITH THE ATTACHED STATEMENT OF WORK AND DRAWINGS.	1	T.T			
12. DISCOUNT FOR PROMPT PAYMENT <input type="checkbox"/> a. 10 CALENDAR DAYS (%) <input type="checkbox"/> b. 20 CALENDAR DAYS (%) <input type="checkbox"/> c. 30 CALENDAR DAYS (%) <input type="checkbox"/> d. CALENDAR DAYS NUMBER PERCENTAGE						
NOTE: Additional provisions and representations <input type="checkbox"/> are <input type="checkbox"/> are not attached						
13. NAME AND ADDRESS OF QUOTER			14. SIGNATURE OF PERSON AUTHORIZED TO SIGN QUOTATION		15. DATE OF QUOTATION	
a. NAME OF QUOTER						
b. STREET ADDRESS			16. SIGNER			
c. COUNTY			a. NAME (Type or print)		b. TELEPHONE	
					AREA CODE	
d. CITY			e. STATE f. ZIP CODE		c. TITLE (Type or print)	
					NUMBER	

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SECTION F TIME OF DELIVERY

DELIVERIES SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS

ITEM	QUANTITY	DELIVERY REQUIRED
0001	1 LT	04-SEP-15

52.213-4 Terms and Conditions--Simplified Acquisitions (Other Than Commercial Items) (MAY 2004)

(a) The Contractor shall comply with the following Federal Acquisition Regulation (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS) clauses that are incorporated by reference:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-3, Convict Labor (June 2003) (E.O. 11755).  
(ii) 52.222-21, Prohibition of Segregated Facilities (Feb 1999) (E.O. 11246).

(iii) 52.222-26, Equal Opportunity (Apr 2002) (E.O. 11246).

(iv) 52.225-13, Restrictions on Certain Foreign Purchases (Dec 2003) (E.O.s, proclamations, and statutes administered by the Office of Foreign Assets Control of the Department of the Treasury).

(v) 52.233-3, Protest After Award (Aug 1996) (31 U.S.C. 3553).

(2) Listed below are additional clauses that apply:

(i) 252.204-7003, Control of Government Personnel Work Product (Apr 1992)

(ii) 52.232-1, Payments (Apr 1984).

(iii) 52.232-8, Discounts for Prompt Payment (Feb 2002).

(iv) 52.232-11, Extras (Apr 1984).

(v) 52.232-25, Prompt Payment (Oct 2003).

(vi) 52.233-1, Disputes (Jul 2002).

(vii) 252.243-7001 Pricing of Contract Modifications (Dec 1991)

(viii) 52.244-6, Subcontracts for Commercial Items (May 2004).

(ix) 52.253-1, Computer Generated Forms (Jan 1991).

(b) The Contractor shall comply with the following FAR and DFARS clauses, incorporated by reference, unless the circumstances do not apply:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-19, Child Labor--Cooperation with Authorities and Remedies (Jan 2004) (E.O. 13126). (Applies to contracts for supplies exceeding the micro-purchase threshold.)

(ii) 52.222-20, Walsh-Healey Public Contracts Act (Dec 1996) (41 U.S.C. 35-45) (Applies to supply contracts over \$10,000 in the United States, Puerto Rico, or the U.S. Virgin Islands).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Dec 2001) (38 U.S.C. 4212) (Applies to contracts of \$25,000 or more).

(iv) 52.222-36, Affirmative Action for Workers with

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Disabilities (June 1998) (29 U.S.C. 793). (Applies to contracts over \$10,000, unless the work is to be performed outside the United States by employees recruited outside the United States.) (For purposes of this clause, United States includes the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.)

(v) 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Dec 2001) (38 U.S.C. 4212) (Applies to contracts of \$25,000 or more).

(vi) 52.222-41, Service Contract Act of 1965, As Amended (May 1989) (41 U.S.C. 351, et seq.) (Applies to service contracts over \$2,500 that are subject to the Service Contract Act and will be performed in the United States, District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, Johnston Island, Wake Island, or the outer continental shelf lands).

(vii) 52.223-5, Pollution Prevention and Right-to-Know Information (Aug 2003) (E.O. 13148) (Applies to services performed on Federal facilities).

(viii) 252.225-7001, Buy American Act and Balance of Payments Program (Apr 2003) (Applies to all contracts for supplies unless an exception is authorized by DFARS 225.1101(2) (i) through (iv)).

(ix) 252.225-7013, Duty-Free Entry (Apr 2003) (Applies to all contracts for supplies except those supplies that will not enter the customs territory of the United States).

(x) 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration (Oct 2003). (Applies when the payment will be made by electronic funds transfer (EFT) and the payment office uses the Central Contractor Registration (CCR) database as its source of EFT information.)

(xi) 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration (May 1999). (Applies when the payment will be made by EFT and the payment office does not use the CCR database as its source of EFT information.)

(xii) 252.247-7023, Transportation of Supplies by Sea (May 2002) Alternate III (May 2002) (Applies when transporting any supplies by sea under this contract.)

(2) Listed below are additional clauses that may apply:

(i) 52.204-7, Central Contractor Registration (Oct 2003) (Applies to all contracts unless an exception is authorized by FAR 4.1102(a).)

(ii) 252.204-7004, Alternate A (Nov 2003) (Applies if FAR 52.204-7 is applicable.)

(iii) 52.209-6, Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (July 1995) (Applies to contracts over \$25,000).

(iv) 52.211-5 Material Requirements (Aug 2000) (Applies to contracts for supplies that are not commercial items).

(v) 52.211-17, Delivery of Excess Quantities (Sept 1989) (Applies to fixed-price supplies).

(vi) 252.225-7002, Qualifying Country Sources as Subcontractors (Apr 2003) (Applies if the contract is subject to the DFARS clause 252.225-7001, Buy American Act and Balance of Payments Program (see (b)(1)(viii) above)).

(vii) 52.243-1, Changes--Fixed Price (Aug 1987) (Applies to fixed-price contracts for supplies).

(viii) 52.243-1, Changes--Fixed Price (Aug 1987)

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Alternate I (Apr 1984) (Applies to fixed price contracts for services, other than architect-engineer or other professional services, and no supplies are to be furnished).

(ix) 52.243-1, Changes--Fixed Price (Aug 1987) Alternate II (Apr 1984) (Applies to fixed price contracts for services (other than architect-engineer services, transportation, or research and development) and supplies are to be furnished).

(x) 52.243-1, Changes--Fixed Price (Aug 1987) Alternate V (Apr 1984) (Applies to fixed price contracts for research and development).

(xi) 52.247-29, F.o.b. Origin (Jun 1988) (Applies to supplies if delivery is f.o.b. origin).

(xii) 52.247-34, F.o.b. Destination (Nov 1991) (Applies to supplies if delivery is f.o.b. destination).

(xiii) 52.222-42, Statement of Equivalent Rates for Federal Hires (May 1989) (Applies if the contract amount is expected to be over \$2,500 and the contract is subject to the clause 52.222-41, "Service Contract Act of 1965, As Amended" (see (b)(1)(vi) above)).

In compliance with the Service Contract Act of 1965, as amended, and the regulations of the Secretary of Labor (29 CFR Part 4), this clause identifies the classes of service employees expected to be employed under the contract and states the wages and fringe benefits payable to each if they were employed by the contracting agency subject to the provisions of 5 U.S.C. 5341 or 5332.

This Statement is for Information Only:

It is not a Wage Determination

Employee Class	Monetary Wage--Fringe Benefits
_____	_____
_____	_____
_____	_____

(xiv) 52.246-11 Higher-Level Contract Quality Requirement (Feb 1999) (Applies to contracts when the contracting officer finds it is in the Governments interest to require that higher-level quality standards be maintained and such standards are selected and identified in the clause).

The Contractor shall comply with the higher-level quality standard selected below. [If more than one standard is listed, the offeror shall indicate its selection by checking the appropriate block.]

Title	Number	Date	Tailoring
* _____	_____	_____	_____
* _____	_____	_____	_____
* _____	_____	_____	_____
* _____	_____	_____	_____

[Contracting Officer insert the title, number (if any), date, and tailoring (if any) of the higher-level quality standards.]

(c) FAR 52.252-2, Clauses Incorporated by Reference (Feb 1998). This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer

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will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

FAR clauses - <http://www.arnet.gov/far/>  
DFARS clauses - <http://www.acq.osd.mil/dp/dars/dfars.html>

(d) Inspection/Acceptance. The Contractor shall tender for acceptance only those items that conform to the requirements of this contract. The Government reserves the right to inspect or test any supplies or services that have been tendered for acceptance. The Government may require repair or replacement of nonconforming supplies or reperformance of nonconforming services at no increase in contract price. The Government must exercise its postacceptance rights--

(1) Within a reasonable period of time after the defect was discovered or should have been discovered; and  
(2) Before any substantial change occurs in the condition of the item, unless the change is due to the defect in the item.

(e) Excusable delays. The Contractor shall be liable for default unless nonperformance is caused by an occurrence beyond the reasonable control of the Contractor and without its fault or negligence, such as acts of God or the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather, and delays of common carriers. The Contractor shall notify the Contracting Officer in writing as soon as it is reasonably possible after the commencement of any excusable delay, setting forth the full particulars in connection therewith, shall remedy such occurrence with all reasonable dispatch, and shall promptly give written notice to the Contracting Officer of the cessation of such occurrence.

(f) Termination for the Government's convenience. The Government reserves the right to terminate this contract, or any part hereof, for its sole convenience. In the event of such termination, the Contractor shall immediately stop all work hereunder and shall immediately cause any and all of its suppliers and subcontractors to cease work. Subject to the terms of this contract, the Contractor shall be paid a percentage of the contract price reflecting the percentage of the work performed prior to the notice of termination, plus reasonable charges that the Contractor can demonstrate to the satisfaction of the Government, using its standard record keeping system, have resulted from the termination. The Contractor shall not be required to comply with the cost accounting standards or contract cost principles for this purpose. This paragraph does not give the Government any right to audit the Contractor's records. The Contractor shall not be paid for any work performed or costs incurred that reasonably could have been avoided.

(g) Termination for cause. The Government may terminate this contract, or any part hereof, for cause in the event of any default by the Contractor, or if the Contractor fails to comply with any contract terms and conditions, or fails to provide the Government, upon request, with adequate assurances of future performance. In the event of termination for cause, the Government shall not be liable to the Contractor for any amount for supplies or services not accepted, and the Contractor shall be liable to the Government for any and all rights and remedies provided by law. If it is determined that the Government improperly terminated this contract for

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default, such termination shall be deemed a termination for convenience.

(h) Warranty. The Contractor warrants and implies that the items delivered hereunder are merchantable and fit for use for the particular purpose described in this contract.

(End of clause)

Your quotation must include the following information:

Price list number and date

or

Cost breakdown by direct labor (list categories, hours and pay rates). In addition to the direct rates, provide the applicable indirect information (G&A), overhead, facilities capital cost of money (FCCM) and profit.

or

Applicable General Services Administration (GSA) contract number.

If unable to quote FOB, Destination, please complete the following:

FOB Point \_\_\_\_\_

Estimated Shipping Charge \_\_\_\_\_

Business size:

Large \_\_\_\_\_ Small \_\_\_\_\_ Nonprofit \_\_\_\_\_

Cage Code \_\_\_\_\_

Tax Identification Number (TIN) \_\_\_\_\_

DUNNS \_\_\_\_\_

ELIGIBILITY REQUIREMENTS

All contractors and individuals doing business with the Federal Government must be registered at the Contractor Central Registration Database located at:  
<http://ccr.dlsc.dla.mil/>.

ELECTRONIC DISTRIBUTION OF CONTRACT DOCUMENTS

All contract award and contract modification documents will be distributed electronically using the Navy Air Force Interface (NAFI) system. The contractor's copy will be provided in portable document format (pdf) as an

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attachment to an e-mail that will be sent to the contractor by the NAFI system. A pdf file may be accessed using Adobe Acrobat Reader software. This is a free software that may be downloaded at:

<http://www.adobe.com/products/acrobat/readstep.html>

Provide the following information that will be used to make electronic distribution for any resultant contract:

Name of Point of Contact to Receive  
Distribution \_\_\_\_\_

Phone Number for Point of Contact \_\_\_\_\_

E-Mail Address for Receipt of Distribution \_\_\_\_\_

USE OF THE GOVERNMENTWIDE COMMERCIAL PURCHASE CARD

Will you accept the Governmentwide Commercial Purchase Card as a method of purchasing supplies and/or services.

\_\_\_\_\_ Yes

\_\_\_\_\_ No

Will you accept the Governmentwide Commercial Purchase Card as a method of payment for your invoice.

\_\_\_\_\_ Yes

\_\_\_\_\_ NO

DUTY FREE ENTRY

Will any materials being shipped to the Government require a duty-free entry certificate for foreign supplies.

\_\_\_\_\_ Yes

No

If yes, please include dollar amount \$\_\_\_\_\_

**Statement of Work**  
**Metal Matrix Composite Sample Machining**

1. The contractor will machine various mechanical property test specimens from government furnished materials (GFM). The government will furnish aluminum bronze, phosphor bronze, and metal matrix composite (MMC) castings of tungsten carbide particles in bronze. The MMC material will be supplied in the form of sedimentation cast discs with approximate dimensions of 8" diameter and 1 1/4" thickness. To make the sedimentation castings, tungsten carbide particles were added to molten bronze prior to pouring the castings. The MMC castings were poured such that the tungsten carbide particles were allowed to settle and concentrate into the bottom halves of the discs. The layer of concentrated tungsten carbide particles is approximately 5/8" thick. This layer is very hard. The MMC specimens will be removed from this layer. The government will provide at least five MMC castings.

2. The types, quantities, and sizes of samples needed are as described in the attached table with additional information as provided below.

- A. **Flat Tensile Specimens** – The finished specimen dimensions are shown in Figure 1. Five specimens are to be wholly machined from the sedimented, tungsten carbide-rich layer in the GFM, 8" diameter by 1 1/4" thick, MMC bronze castings. The general location of the samples as they are to be removed from the MMC casting are shown in Figure 2. Five specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.
- B. **Compression Specimens** – The finished specimen dimensions are shown in Figure 3. Five specimens are to be wholly machined from the sedimented, tungsten carbide-rich layer in the GFM, 8" diameter by 1 1/4" thick, MMC bronze castings. The general location of the samples as they are to be removed from the MMC casting are shown in Figure 4. Five specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.
  - a. For all of the compression specimens the lateral surfaces in the gage length shall not vary in diameter, width, or thickness by more than 1% or 0.002", whichever is less.
  - b. The centerline of all lateral surfaces shall be coaxial within 0.01".
  - c. Machined surfaces of specimens shall have a surface finish of 63 microinches or better.
  - d. The ends of a specimen shall be flat and parallel within 0.0005 in./in. and perpendicular within 3' of arc.
- C. **Impact specimens, Charpy V-Notch (CVN)** - The finished specimen dimensions are shown in Figure 5. Ten specimens are to be wholly machined from the sedimented, tungsten carbide-rich layer in the GFM, 8" diameter by 1 1/4" thick, MMC bronze castings. The general location of the samples as



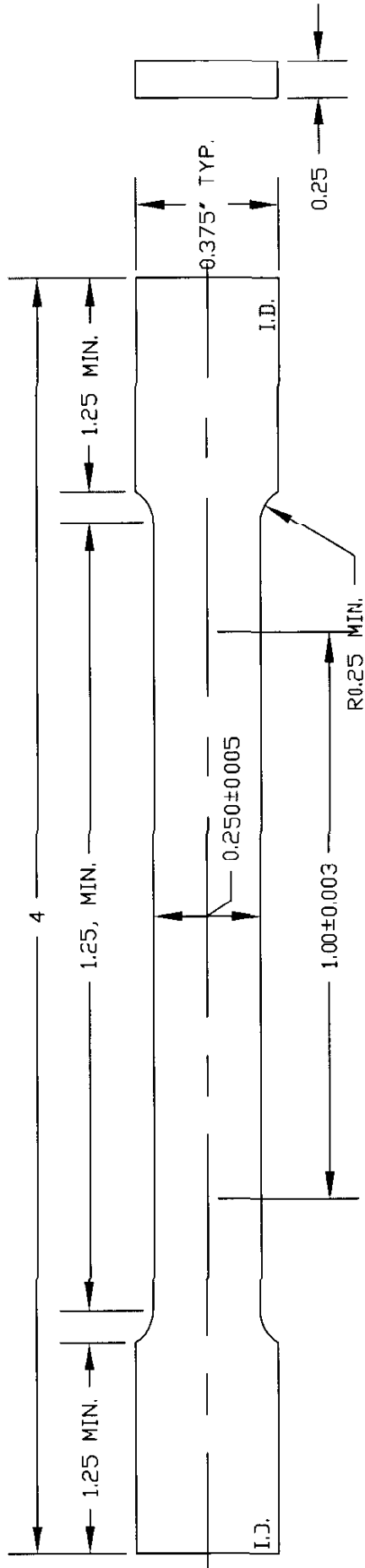
they are to be removed from the MMC casting are shown in Figure 6. Ten specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.

- D. **Fatigue Crack Growth** - The finished specimen dimensions are shown in Figure 7. Six specimens are to be wholly machined from the sedimented, tungsten carbide rich layer in the GFM, 8" diameter by 1 1/4" thick, MMC bronze castings. The general location of the samples as they are to be removed from the MMC casting are shown in Figure 8. Six specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.
- E. **Fracture Toughness** - The finished specimen dimensions are shown in Figure 9. Five specimens are to be wholly machined from the sedimented, tungsten carbide-rich layer in the GFM, 8" diameter by 1 1/4" thick, MMC bronze castings. The general location of the samples as they are to be removed from the MMC casting are shown in Figure 10. Five specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.
- F. **Wear, abrasion** - The finished specimen dimensions are shown in Figure 11. No MMC specimens are needed. Five specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.
- G. **Wear, pin-on-disc** - The finished specimen dimensions are shown in Figure 12. No MMC specimens are needed. Five specimens each are to be made from GFM phosphor bronze and aluminum bronze. The phosphor bronze and aluminum bronze samples may be removed from any convenient part of the GFM of these alloys.

## Mechanical Property Specimens

Specimen Type	ASTM Spec.	Material	Approx. Specimen Dimensions	Quantity
Tensile, flat	E8	MMC (specimen blank removed from the predominately tungsten carbide layer in a sedimentation casting of aluminum bronze and tungsten carbide)	4" x 3/8" x 1/4"	5
Tensile, flat	E8	Aluminum bronze	4" x 3/8" x 1/4"	5
Tensile, flat	E8	Phosphor bronze	4" x 3/8" x 1/4"	5
Compression	E9	MMC (specimen blank removed from the predominately tungsten carbide layer in a sedimentation casting of aluminum bronze and tungsten carbide). Long axis of the specimen to be aligned in a direction parallel to sedimented layer of tungsten carbide.	0.5" dia. X 1" long	5
Compression	E9	Aluminum bronze	0.5" dia. X 1" long	5
Compression	E9	Phosphor bronze	0.5" dia. X 1" long	5
Charpy V-Notch	E23	MMC (specimen blank removed from the predominately tungsten carbide layer in a sedimentation casting of aluminum bronze and tungsten carbide). Long axis of the specimen to be aligned in a direction parallel to sedimented layer of tungsten carbide.	0.4" x 0.4" x 2.165"	10
Charpy V-Notch	E23	Aluminum bronze	0.4" x 0.4" x 2.165"	10
Charpy V-Notch	E23	Phosphor bronze	0.4" x 0.4" x 2.165"	10
Fatigue Crack Growth	E647	MMC (specimen blank removed from the predominately tungsten carbide layer in a sedimentation casting of aluminum bronze and tungsten carbide)	4.25" x 4" x 0.5"	6
Fatigue Crack Growth	E647	Aluminum bronze	4.25" x 4" x 0.5"	6
Fatigue Crack Growth	E647	Phosphor bronze	4.25" x 4" x 0.5"	6
Fracture Toughness	E1820	MMC (specimen blank removed from the predominately tungsten carbide layer in a sedimentation casting of aluminum bronze and tungsten carbide)	1" x 1" x 0.5"	5
Fracture Toughness	E1820	Aluminum bronze	1" x 1" x 0.5"	5
Fracture Toughness	E1820	Phosphor bronze	1" x 1" x 0.5"	5
Wear, abrasive	G65	Aluminum bronze	1" x 3" x 0.5"	5
Wear, abrasive	G65	Phosphor bronze	1" x 3" x 0.5"	5
Wear, pin-on-disc	G99	Aluminum bronze	1" x 1" x 0.5"	5
Wear, pin-on-disc	G99	Phosphor bronze	1" x 1" x 0.5"	5

# Figure 1-Flat Tensile Specimen



T = AS RECEIVED THICKNESS, LESS CLEAN UP REQUIRED, MAXIMUM THICKNESS = 0.25".

- NOTES:
1. SPECIMEN TO BE MACHINED IN THE FREE & NATURAL STATE AS RECEIVED. (NO BENDING, STRAIGHTENING OR DISTORTION ALLOWED.)
  2. BLENDING RADIUS (2) TO TEST LENGTH MAX. VAVINESS 0.002.
  3. MAINTAIN SPECIMEN IDENTIFICATION ON EACH GRIP END.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS: ±1/64 DECIMALS: ±0.01 ANGLES: ±1/2°	POINTS OF CONTACT: 1) Giuseppe Iorio 2) Dr. Aprigliano PHONE #301 227-5094 # 301 227-4155 FILE NAME:	NSWC CARDEROCK - METALS DEPARTMENT - CODE 61	
		DRAWING NAME: Flat Tensile	
		PROGRAM: MATERIAL:	
	SPECIMEN NO.:	SCALE:	REV:

Top & Bottom  
View

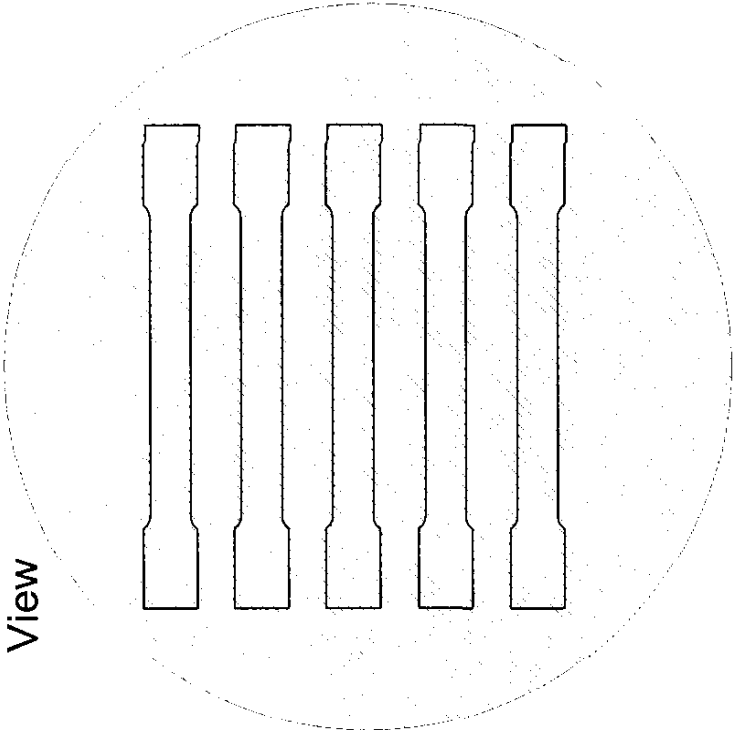
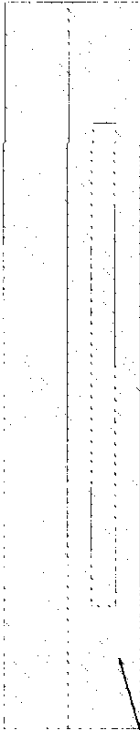


Figure 2. Placement of Tensile  
Specimens

Front View



WC/Bronze Layer

Unless otherwise noted, tolerances are:  
N.X ±0.05 X/N min of ±1/32  
N.XX ±0.01  
N.XXX ±0.002

DRAWN BY: GIUSEPPE IORIO  
REVIEWED BY:

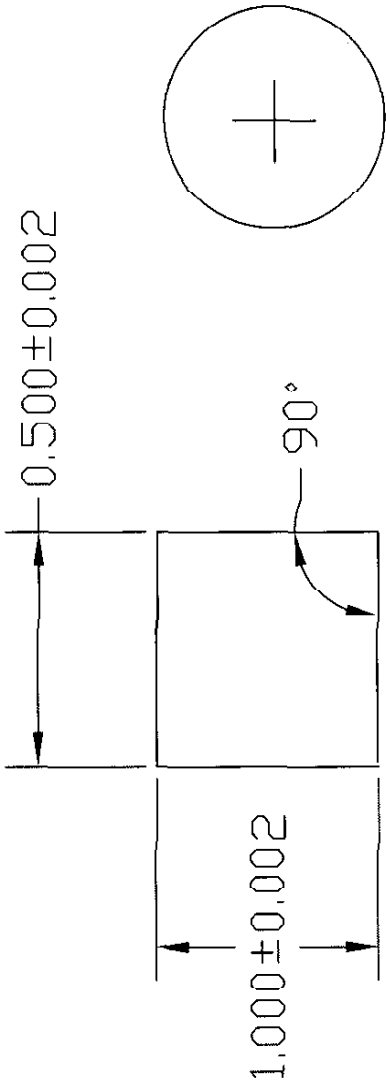
DATE  
JUNE 23, 2004

BLDG. 60, RM. 202 227-5094  
Cardenack Division, NSWC

CONDITION: Rough Conditions  
Revision C  
MATERIAL: Bronze & WC  
SIZE A  
SCALE  
QTY: 1

Tensile Samples configuration

Figure 3 Compression Specimen

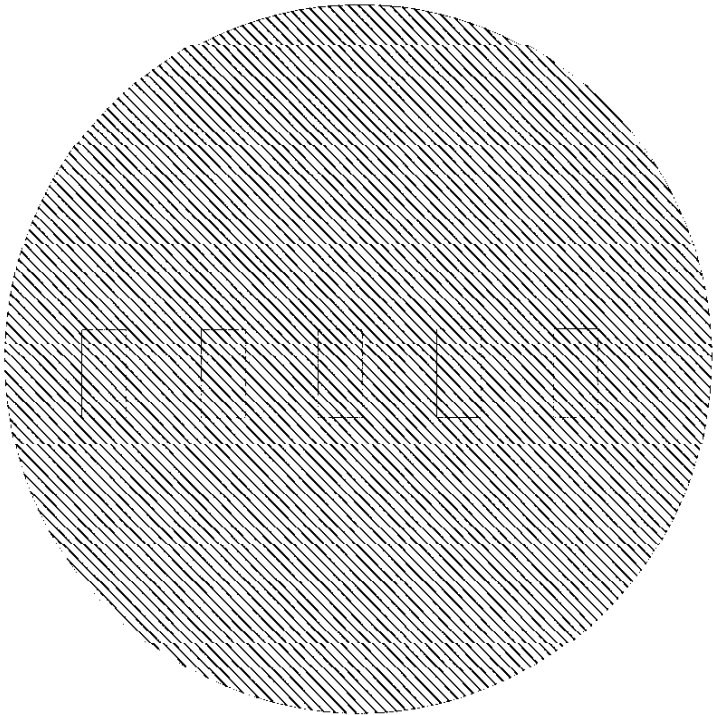


NOTES:

- 1. All surfaces shall be parallel and perpendicular within 0.001" T. I. R.
- 2. Surface finish shall be  $\sqrt{16}$
- 3. No turning centers allowed.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS: $\pm 1/64$ DECIMALS: $\pm 0.01$ ANGLES: $\pm 1/2^\circ$	POINTS OF CONTACT: 1) _____ 2) _____ PHONE #:		NSWC CARDEROCK - METALS DEPARTMENT - CODE 61	
	NAME: 1.0" Compression		DRAWING NAME: 1" Compression	
	SPECIMEN NO.:		PROGRAM: MATERIAL:	
			SCALE:	REV:      DATE:

Top & Bottom  
View



Side View

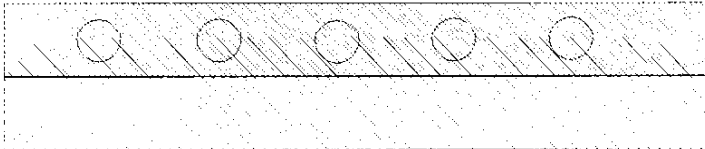
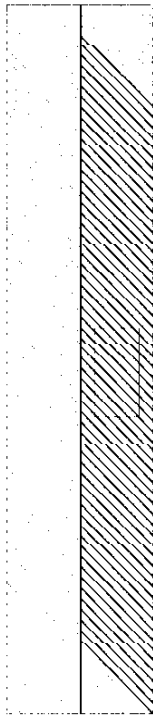


Figure 4 Placement of Compression  
Specimens



Front View

Unless otherwise noted, tolerances are  
N.X. ±0.05 1/N min of ±1/32  
N.XX ±0.01 or ±X/2N  
N.XXX ±0.002

DRAWN BY: GIUSEPPE IORIO  
REVIEWED BY:

DATE  
June 25, 2004

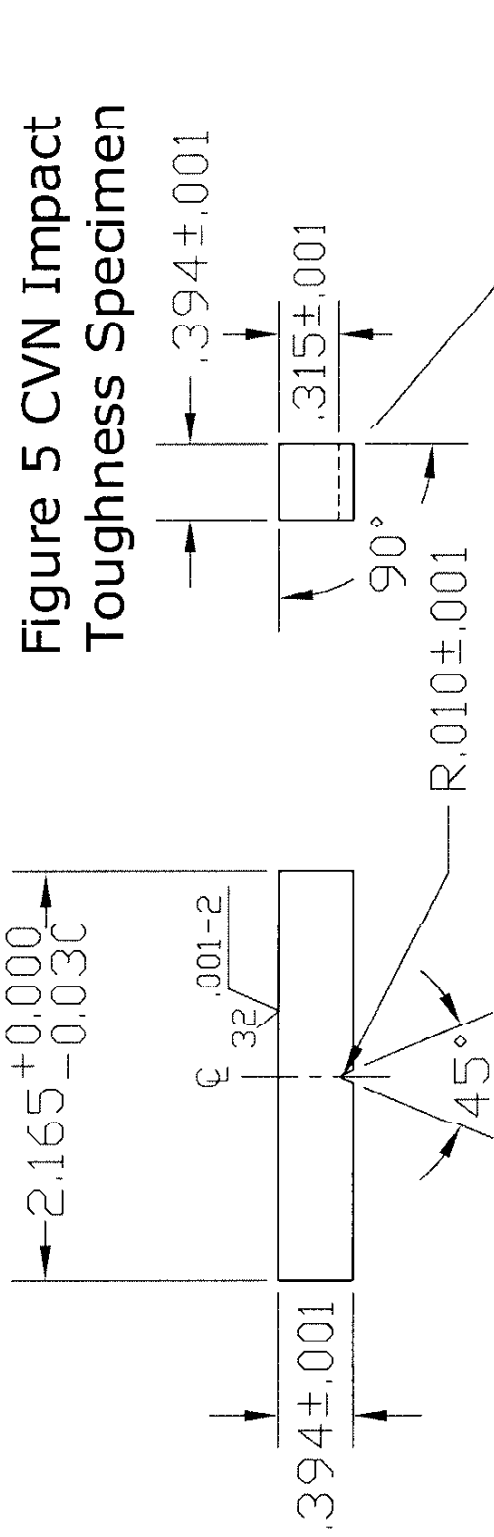
CODE 612  
BLDG. 60, RM. 802  
Carderock Division, NSTC

Drawing  
MATERIAL  
CONDITION:  
Revision 0  
Process & WC  
Rough Conditions

SIZE A  
SCALE  
QTY: 1

Compression Specimens

Figure 5 CVN Impact Toughness Specimen



SEE NOTES 2&3

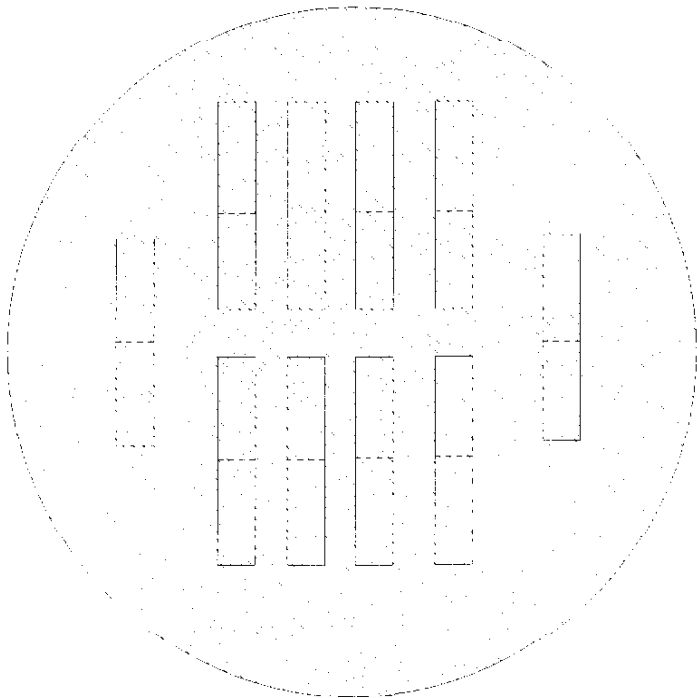
NOTES:

1. SPECIMEN TO BE MACHINED IN FREE & NATURAL STATE AS RECEIVED (NO BENDING, STRAIGHTENING OR DISTORTION ALLOWED.)
2. CARAT STAMPED ON SPECIMEN END INDICATES FACE NOTCH IS TO BE MACHINED IN.
3. MAINTAIN IDENTIFICATION (I.D.) ON BOTH ENDS.
4. BOTTOM OF NOTCH MUST BE PARALLEL WITH OPPOSITE SIDE.

<p>JNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES:</p> <p>FRACTIONS: <math>\pm 1/64</math></p> <p>DECIMALS: <math>\pm 0.01</math></p> <p>ANGLES: <math>\pm 1/2^\circ</math></p>	POINTS OF CONTACT:		NSWC CARDEROCK - METALS	
	1)		DEPARTMENT - CODE 61	
	2)		DRAWING NAME: CVN (CHARPY)	
	PHONE #:		PROGRAM:	
	FILE NAME: CVN.DWG		MATERIAL:	
	SPEC #:		SCALE:	REV: DATE:

Top View

NOTE:  
Dimensions to be taken from the  
center of the holes.



Front View

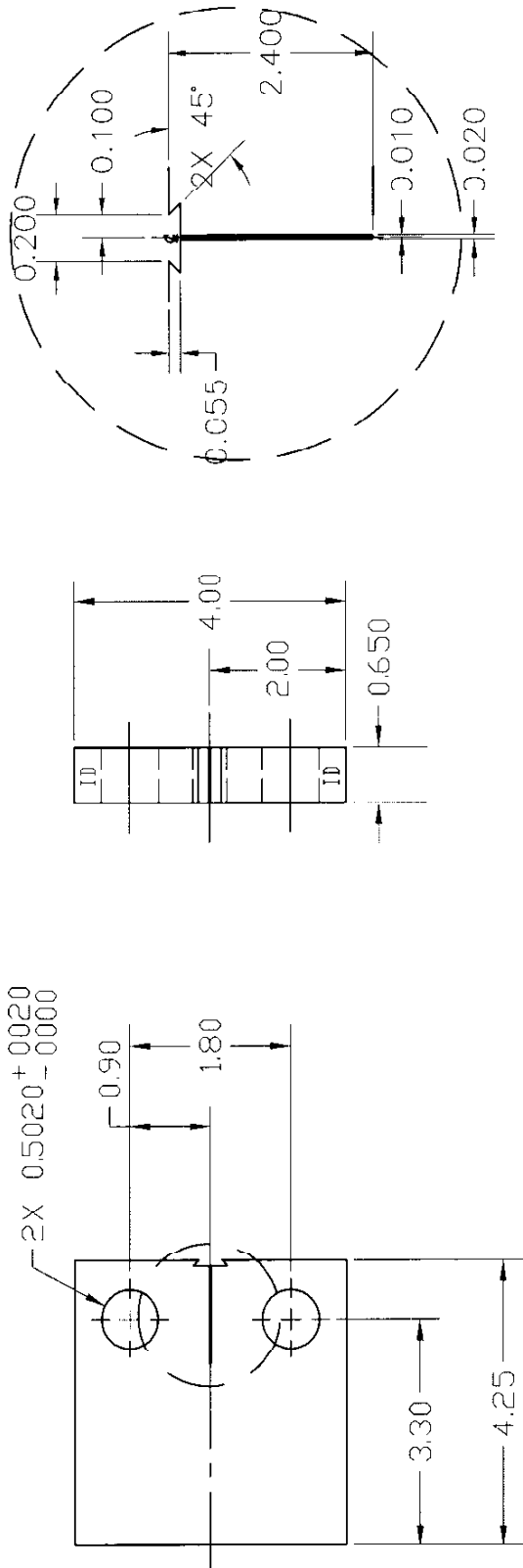
Front View

Figure 6. Impact Toughness CVN  
Specimens  
WC-Bronze  
Layer

Unless otherwise noted, tolerances are  
in inches  
NXX ±0.01  
NXX ±0.002

CVN Specimen Machining				Revision 0				SIZE A
DRAWN BY: GIUSEPPE TORIO		DATE: June 23, 2004		CODE 612		BLDG. 60, 2M, 202		227-5094
REVIEWED BY:						Cardroot Division, NSW		
						MATERIAL: Bronze & WC		SCALE
						CONDITION: Rough Condition		QTY: 1





NOTES:

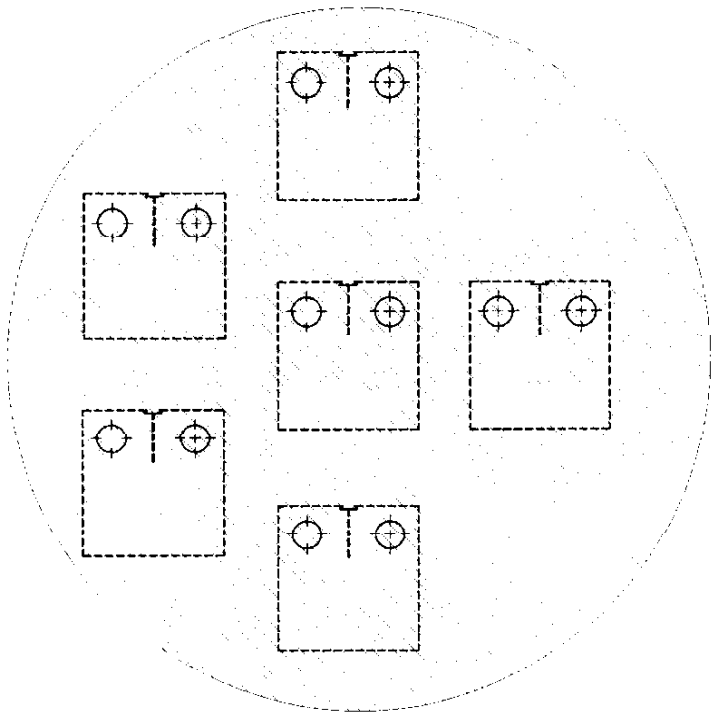
1. STAMP SPECIMEN ID AS INDICATED.
2. SLOT WIDTH MAY BE AS SMALL AS EDM WIRE DIAMETER.
3. ALL SURFACES TO BE PARALLEL AND PERPENDICULAR WITHIN .002 TIR.
4. INTERNAL RADIUS MIN .000 AND MAX .010

Figure 7 Fatigue Crack Growth Specimen

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS: $\pm 1/64$ DECIMALS: $\pm 0.01$ ANGLES: $\pm 1/2^\circ$	POINTS OF CONTACT: 1) Giuseppe Iorio 2) PHONE #: 301 227-5094		NSWC CARDEROCK - METALS DEPARTMENT - CODE 61	
	FILE NAME:		DRAWING NAME: 065T FCGR	
			PROGRAM: MATERIAL:	
	SPECIMEN NO.:		SCALE:	REV: / DATE: 6-25-04

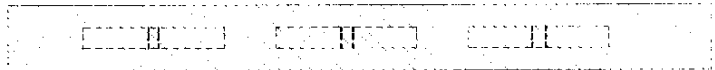
Top View

DATE: 6/23/2004  
DRAWN BY: GIUSEPPE IORIO  
REVIEWED BY:



Side View

WC-Bronze Layer



Front View

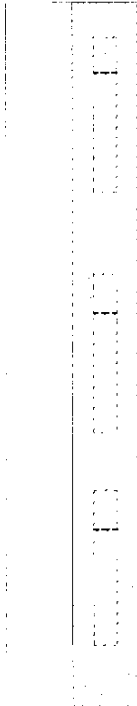
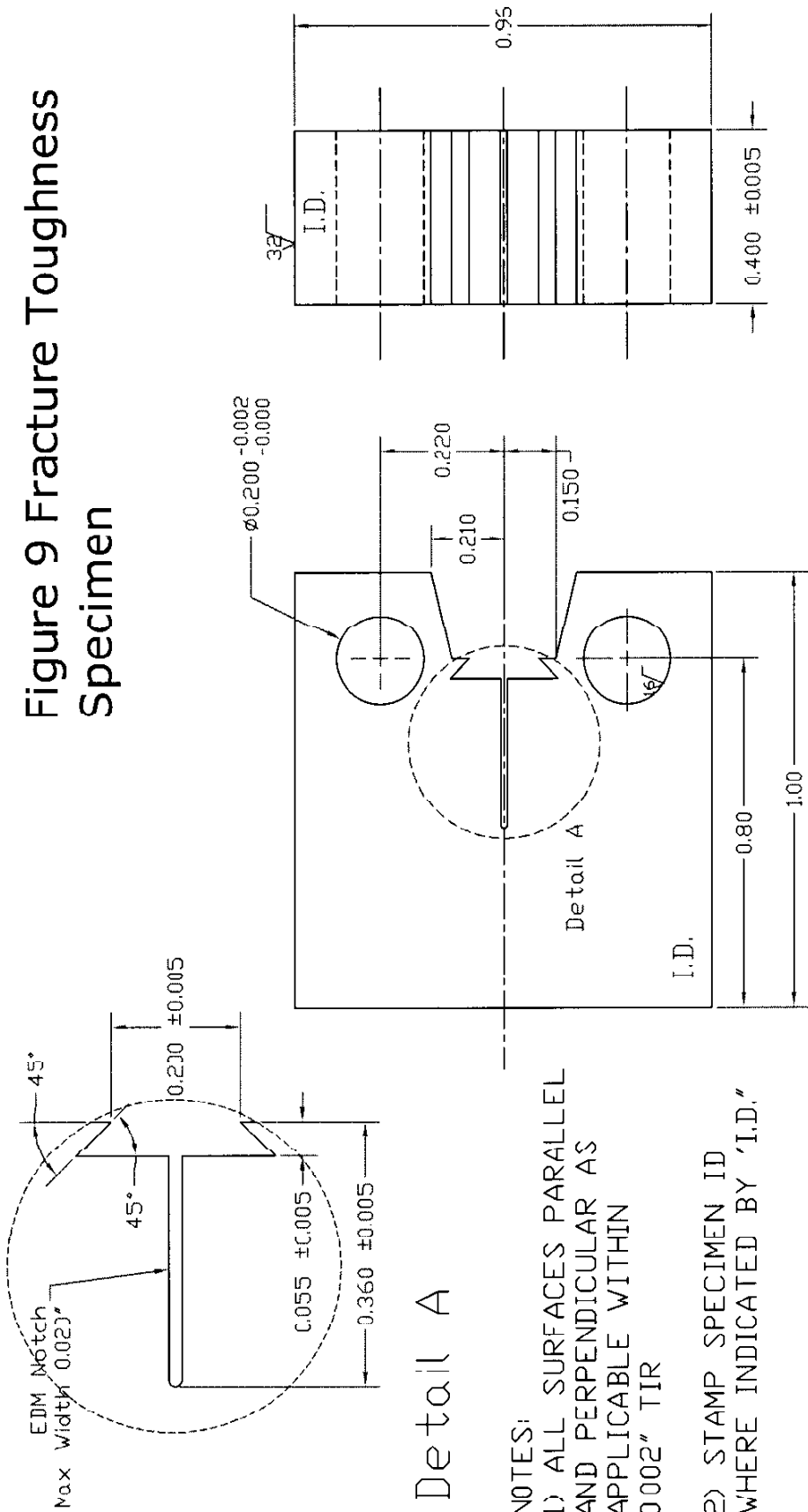


Figure 8. Placement of Fatigue Crack Growth Samples

Fatigue Specimen Machining									
Drawing									
Revision 0									
SIZE A									
MATERIAL									
Bronze & WC									
SCALE									
CONDITION:									
Rough Conditions									
QTY: 1									
CODE 612									
227-5084									
BIDC 60, RM, 202									
Carderock Division, NSWC									
DATE									
June 23, 2004									
DRAWN BY: GIUSEPPE IORIO									
REVIEWED BY:									
N.X ±0.05 noted, tolerances are									
N.XX ±0.01									
N.XXX ±0.002									
or ±X/2N									

Unless otherwise noted, tolerances are:  
N.X ±0.05  
N.XX ±0.01  
N.XXX ±0.002

Figure 9 Fracture Toughness Specimen

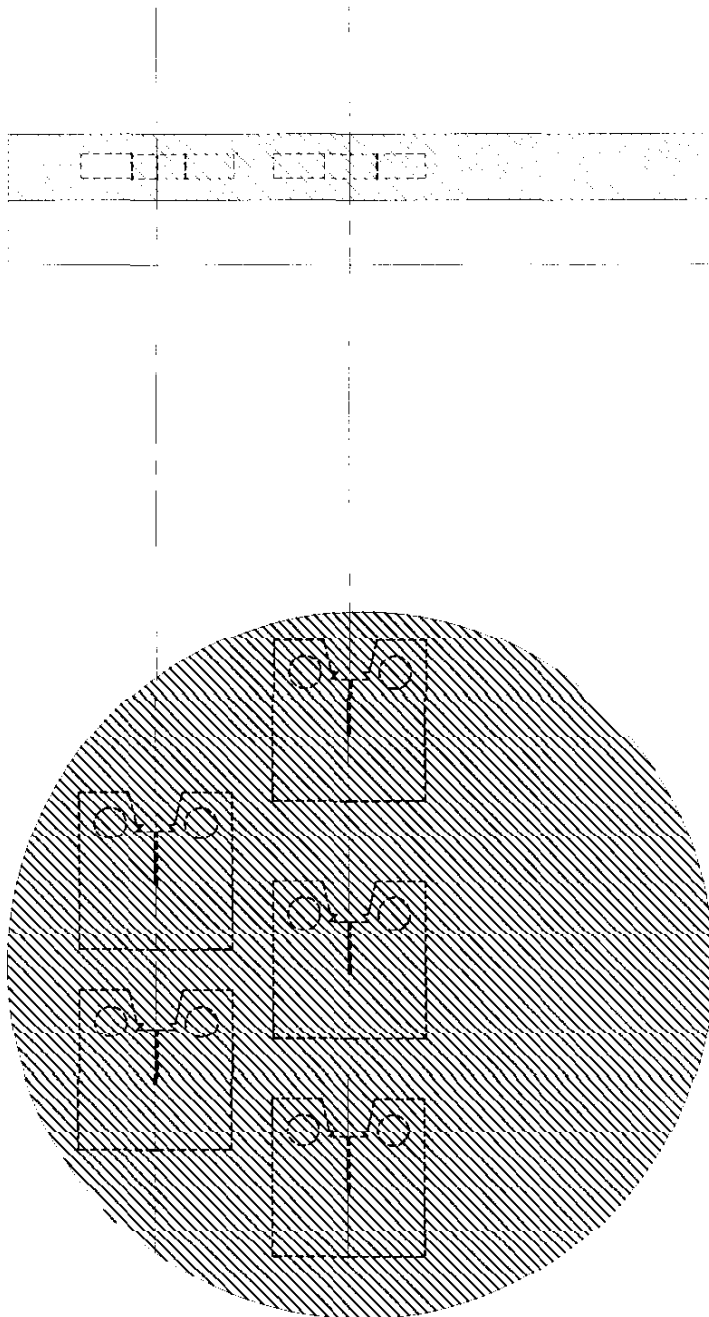


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES:  FRACTIONS: ±1/64 DECIMALS: ±0.01 ANGLES: ±1/2°	POINTS OF CONTACT: 1) Giuseppe Iorio 2) _____ PHONE #(301)227-5094		NSWC CARDEROCK - METALS DEPARTMENT - CODE 61	
	FILE NAME: 0.40T 0.45aw C(T).dwg		DWG NAME: 0.40T C(T) 0.45a/W	
	SPEC. #:		PROGRAM:	
			MATERIAL:	
		SCALE:	REV:	DATE: 6/25/04

NOTE:  
Specimens for fracture tests are  
located on the right.

Top View

Side View  
WC-Bronze  
Layer



Front View

Figure 10. Placement of Fracture  
Toughness Samples

Unless otherwise noted, tolerances are:  
N.X ±0.05 X/N min of ±1/32  
N.XX ±0.01 or ±X/2N  
N.XXX ±0.002

DRAWN BY: GIUSEPPE JORD  
REVIEWED BY:

DATE  
June 23, 2004

CODE 612  
BLDG 60, RM. 202  
Caterpillar Division, MSWC

MATERIAL  
227-6094

CONDITION:  
Revision 0  
Bronze & WC  
Rough Conditions

SIZE A  
SCALE  
QTY: 1

Specimen Machining

Giuseppe Jorio

6/23/2004  
Border ISO-A

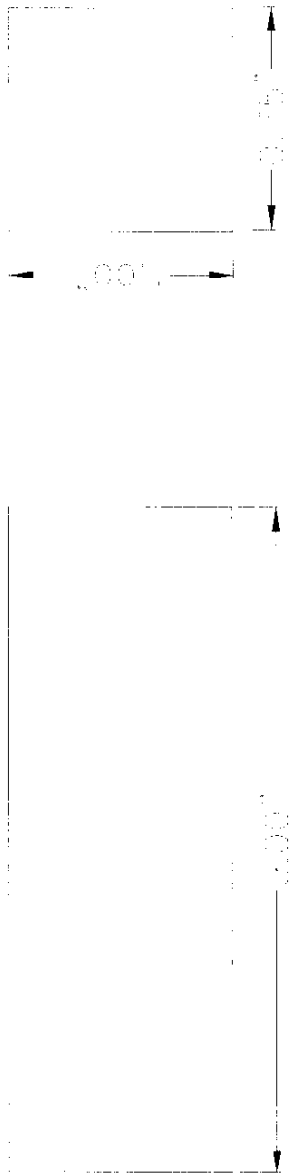


Figure 11 Wear , Abrasion Specimen

Figure 11 Wear, Abrasion Specimen

Wear Abrasion Specimen									
Drawing		Revision 0		SIZE A					
MATERIAL		Bronze & Tungsten Carbide		SCALE					
CONDITION:		Rough		QTY: 1					
DRAWN BY: GIUSEPPE IORIO		DATE		CODE 612		BLDG. 60, RM. 202		217-5094	
REVIEWED BY:		May 20, 2004				Carderock Division, NSTC			
Unless otherwise noted, tolerances are: N.X ±0.05 X/N min of ±1/32 N.XX ±0.01 N.XXX ±0.002									

Giuseppe Iorio  
20/05/2004  
Dwg. No. 190 A



Figure 12 Wear, Pin-on Disc

Unless otherwise noted, tolerances are N.X ±0.05 X/N min of ±1/32 N.XX ±0.01 or ±X/2N N.XXX ±0.002					GIUSEPPE TORIO					Wear Pin-on Disc				
DRAWN BY: GIUSEPPE TORIO					DATE		CODE 612		BLDG. 80, RM. 202		Revision 0		SIZE A	
REVIEWED BY:					May 20, 2004				Carderock Division, NSWC		MATERIAL Bronze & Tungsten Carbide		SCALE	
											CONDITION: Rough		QTY: 1	

Giuseppe Torio

20/05/2004

Border ISD-A

NAME OF OFFEROR OR CONTRACTOR

**THE FOLLOWING INFORMATION IS NEEDED FOR ESTABLISHING PRICE  
REASONABLENESS:**

**QUANTITY OR DOLLAR VALUE OF SERVICES SOLD IN PAST  
YEAR:**

**LIST TWO (2) GOVERNMENT AGENCIES AND TWO (2)  
COMMERCIAL COMPANIES THAT HAVE PURCHASED IN THE  
PAST YEAR**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**LABOR RATES HAVE BEEN IN EFFECT SINCE:**

\_\_\_\_\_  
(DATE)

**TITLE OF PERSONNEL UTILIZED** \_\_\_\_\_

**NUMBER OF LABOR HOURS** \_\_\_\_\_

**HOURLY LABOR RATE** \_\_\_\_\_

**COST OF MATERIAL** \_\_\_\_\_

**DESCRIPTION OF MATERIAL USED** \_\_\_\_\_

**NAME AND TELEPHONE NUMBER  
OF YOUR DCAA POC** \_\_\_\_\_